

REMARKS

Favorable reconsideration of this application, in light of the preceding amendments and following remarks, is respectfully requested.

Claims 1-4, 7, and 9-16 are pending in this application. Claims 1-2 and 15 are amended and claim 16 has been added. Claim 1 is the sole independent claim.

Specification

The specification is amended herewith to correct minor informalities. More specifically, paragraph [0045] on page 14 is amended to correct a minor translation error. There was support for “plane contact” in the original German document in the first paragraph on page 5, but the word “Flächenkontakt” was inaccurately translated as “areal contact”.

The Applicants hereby confirm their willingness to cooperate with the Examiner in the identification and correction of further minor errors within the specification. The Applicants respectfully submit, however, that they are not presently aware of any such errors that would require correction.

Rejections under 35 U.S.C. § 112

Claim 15 stands rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. Applicants respectfully traverse this rejection for the reasons detailed below.

Claim 15 has been amended to recite “area contact” which has support in paragraph [0045] of the specification.

The Applicants, therefore, respectfully request that the rejection to Claim 15 under 35 U.S.C. § 112, first paragraph, be withdrawn.

Example Embodiments of the Present Application

Independent claim 1 recites analyzing the sample liquid, wherein flushing or reagent liquids are applied from above the substrate onto the spots of the spot arrays located on the substrate, and electrical measurements are carried out from below the substrate with the aid of contact elements. Example non-limiting embodiments of this feature are discussed, for example, in paragraph [0021] of the instant specification. With an electrical signal pick-up from a moving sequential arrangement of identical sensors on a belt, a measurement may be taken by picking up the signal on the underside of the substrate with the aid of contact elements. This allows faster analysis of foreign substances on pharmacological substances such as medicines.

Rejections under 35 U.S.C. § 103

Chateau in view of Chen and Gordon

Claims 1, 4, 7 and 9-14 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Chateau (US 4,071,315, hereinafter "Chateau") in view of Chen et al. (US 2001/0051714 A1, hereinafter "Chen") and in view of Gordon et al. (US 2001/0036641 A1, hereinafter "Gordon"). Applicants respectfully traverse this rejection for the reasons detailed below.

The Office Action stated that, regarding claims 1 and 12, Chateau teaches a method for performing a high throughput analysis; that in a single

exemplary embodiment, Chateau teaches a method comprising the use of multiple biochips in the form of a multiplicity of successive reaction areas 13; that a reaction area has one or more reagents fixed thereon and the reagents are biomolecules in the form of antibodies pre-attached to the reaction areas; that the reaction areas are on a tape on a substrate, namely, reaction areas 13 are formed on a longitudinal tape that allows continuous analysis of the plurality of samples; that thus, the tape is interpreted as the instantly claimed substrate, the biochips are interpreted as the reaction areas on the tape, and the reaction areas are interpreted as having a plurality of measurement reagents fixed thereon; that a sample liquid, in the form of a serum containing antibodies to the antigen spots of the biochips, is then deposited on the successive biochips 13; that, because each biochip 13 has one or more reagents fixed thereon, the sample liquid is applied to a plurality of measurement reagents fixed on the biochip 13; that Chateau teaches flushing liquids are applied from above the substrate onto the fixed antibody locations of the biochips located on the substrate, namely, the tape is rinsed in rinsing station 25 from above; that Chateau also teaches analyzing the samples of measurement liquid, wherein applying and analyzing are effected simultaneously at different biochips, namely, depositing and processing of several side by side specimens occurs simultaneously with the recording of information regarding each specimen and the treatment that is given to each specimen; that the substrate is moved to permit a continuous measurement at a speed determined by a movement cycle of the substrate, namely, depositing stations are multiplied so that multiple simultaneous analyses are carried out

by the machine, wherein the tape is progressed by a number of areas as part of the depositing and analysis; that the progression of the tape is the claimed movement cycle; that while Chateau teaches each biochip 13 has one or more reagents fixed thereon, Chateau does not explicitly teach the plurality of fixed reagents are spotted in an array, nor does Chateau teach electrical measurements are carried out from below the substrate with the aid of contact elements, i.e., a tape having electrical contact elements; that however, Chen teaches a substrate in the form of a flexible tape having spots of probes thereon, that Chen teaches the spotting of the probes to form an array has the added advantage of allowing deposition of probe molecules on a tape on a high speed in a continuous fashion; that Chen also teaches the tape substrate comprises a metallic electrode layer; that the metallic electrode layer is a contact element, and Chen teaches the substrate has the added advantage of improving efficiency of hybridization of the immobilized probe to a target; that thus, Chen teaches the known technique of spotting molecules immobilized on a tape as well as the known teaching of using a substrate having electrical contact elements; that it would therefore have been obvious to one of ordinary skill in the art at the time the claimed invention was made to have modified the method comprising a plurality of immobilized reagents on a substrate as taught by Chateau so that the immobilized reagents are spotted on the substrate to form spot arrays in each biochip and so that the substrate has electrical contact elements thereon as taught by Chen to arrive at the instantly claimed method with a reasonable expectation of success; that the ordinary artisan would have been motivated to make the modification because said modification

would have resulted in a method having the added advantage of allowing deposition of probe molecules on a tape in a high speed and continuous fashion as well as the additional added advantage of improving efficiency of hybridization of the immobilized probe to a target as explicitly taught by Chen; that in addition, it would have been obvious to the ordinary artisan that the known techniques of spotting molecules immobilized on a tape and having the contact elements on the substrate as taught by Chen could have been applied to the method of Chateau with predictable results because the known techniques of spotting molecules immobilized on a tape and having the contact elements on the substrate as taught by Chen predictably result in a substrate useful for biomolecular binding assays; that while Chateau teaches a detector on the form of reading station 36, which reads the results, neither Chateau nor Chen teach electrical measurements are carried out from below the substrate with the aid of contact elements, i.e., so that measurements are with biochips that are electrically readable; that however, Gordon teaches electrically readable biochips wherein spots of oligonucleotides 48 are attached to an uppermost layer of electrode 44; that Gordon also teaches the electrodes have electrical contacts for measurements, in the form of data and address buses 126, 128 and 130 are below the substrate 112, which has the added advantage of allowing selective chemical activity at specific electrodes on the chip; that thus, Gordon teaches the known technique of using electrically addressable biochips having electrical contact elements for measurements to be carried out from below the substrate; that it would have been obvious to a person having ordinary skill in the art at the time the claimed invention was made to have

modified the method comprising a substrate having biochip comprising an electrode with a biomolecule immobilized thereon as taught by Chateau in view of Chen so that the biochip is an electrically readable biochip having contact elements for measurements that are carried out from below the substrate to arrive at the instantly claimed invention as taught by Gordon with a reasonable expectation of success; that the ordinary artisan would have been motivated to make the modification because said modification would have resulted in a method having the added advantage of allowing selective chemical activity at specific electrodes on a biochip as explicitly taught by Gordon; and that, in addition, it would have been obvious to the ordinary artisan that the known technique of using the electrical addressable biochips having electrical contact elements for measurements to be carried out from below the substrate of Gordon could have been applied to the method of Chateau in view of Chen with predictable results because the biochips and elements of Gordon predictably result in a substrate useful having individually addressable electrodes. Applicants respectfully disagree.

Chateau (see Figure 1 with associated description) describes only a tape for the continuous analysis of probes. A solution is applied to successively following regions 13. A spatial separation of these regions through a hollow body, which causes only the wetting of the arrays surrounded by the hollow body, is not described. Rather, the body 31 in Chateau represents more of a chamber that surrounds a region of the tape and contains a plurality of spots. No spot arrays are described either, but only successive regions to which a solution is applied. An array has cells and gaps and cannot be compared to

the regions according to Chateau. Chateau also does not expressly describe optical measurement (see lines 27 to 32 in column 8). Furthermore, the device 19 disclosed in Chateau for vacuuming/suctioning is counter-indicative to taking an electrical measurement at the contacts on the back of the tape.

Chen also does not describe a hollow body that separates one spot array from another spot array. Rather, Chen describes a probe chamber (see paragraph [0160]): "The probe carrier thread 100 is moved back-and-forth through the chamber." Only optical measurements are taken for the detection at the probes (see paragraph [0175] and following). No electrical measurement is planned, but only the applying of voltage for improving the immobilization. Electrodes and devices for an electrical measurement to detect probes differ fundamentally from optical devices and electrodes for improving the immobilization of probes and requires different spatial (areas instead of point-resolved) and voltage type conditions (high voltage for electrophoresis and/or Coulomb interaction instead of small voltages for electrochemical measurements).

Gordon describes a biochip for the electrical measuring of probes and/or their reactions in array form. Gordon does not contain references indicating a high throughput analysis, nor a substrate with several biochips applied thereto. A separation of the biochips with the aid of the hollow body is also not described in Gordon.

Gordon does not contain references, which would suggest a combination of Gordon with Chen or with Chateau. When using biochips known from Gordon on a substrate known from Chen or Chateau, a contact from the back

would either not be possible (Chateau) or the area-type electrode on the back (Chen; Figures 16 and 17 with associated description) would short-circuit the data buses 126 to 130 according to Gordon. (see Figure 4).

In summary, Applicants submit that not all features of amended claim 1 are known from a single cited reference, nor does a combination of the references Chen, Chateau, and Gordon result in disclosing all the features of the new claim 1 and that a combination of the above-mentioned cited references also does not suggest itself to one skilled in the art.

The Applicants, therefore, respectfully request that the rejection to Claim 1 under 35 U.S.C. § 103(a) be withdrawn.

Claims 2-4, 7 and 9-14, dependent on independent claim 1, are patentable for the reasons stated above with respect to claim 1 as well as for their own merits.

Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejection to independent claim 1 and all claims dependent thereon.

Chateau in view of Chen, Gordon and Kledzik

Claim 15 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Chateau in view of Chen and in view of Gordon as applied to claims 1 and 14 above, and further in view of Kledzik et al. (US 4,384,199, hereinafter "Kledzik"). Applicants respectfully traverse this rejection for the reasons detailed below.

Even assuming *arguendo* that Kledzik could be combined with Chauteau, Chen and Gordon (which Applicants do not admit), the Examiner has failed to show how Kledzik remedies the deficiencies of Chauteau, Chen and Gordon with respect to independent claim 1. Thus, claim 14 is patentable over Kledzik and Chauteau, Chen and Gordon for the reasons set forth above with respect to independent claim 1.

The Applicants, therefore, respectfully request that the rejection to Claim 1 under 35 U.S.C. § 103(a) be withdrawn.

Claim 15, dependent on independent claim 1, is patentable for the reasons stated above with respect to claim 1 as well as for its own merits.

Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejection to independent claim 1 and all claims dependent thereon.

CONCLUSION

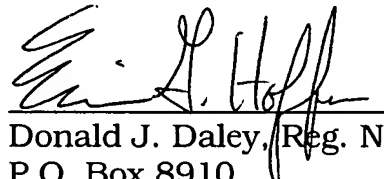
In view of the above remarks and amendments, the Applicants respectfully submit that each of the pending objections and rejections has been addressed and overcome, placing the present application in condition for allowance. A notice to that effect is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to contact the undersigned.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Erin G. Hoffman, Reg. No. 57,752, at the telephone number of the undersigned below.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 08-0750 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

Respectfully submitted,

HARNESS, DICKEY, & PIERCE, P.L.C.

By  Reg. No. 57,752
Donald J. Daley, Reg. No. 34,313
P.O. Box 8910
Reston, Virginia 20195
(703) 668-8000

DJD/EGH:ljs